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Rodlike polymer gelatination as studied by PFG NMR: Fibrin polymerization in human plasma

Mutina A., Skirda V.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The structure formation in rodlike polymers was investigated by the example of polymerization of fibrin rodlike molecules in native plasma. Translational mobility of fibrin molecules in anticoagulated plasma and native plasma during fibrin polymerization was studied by pulse field gradient nuclear magnetic resonance. It was shown that the diffusion decay of anticoagulated plasma can be fitted by the sum of exponents and fibrin molecules have the self-diffusion coefficient Df of 1.53·10-11 m2/s. The diffusion decay of native plasma during fibrin polymerization becomes nonexponential and is described by the lognormal distribution of fibrin self-diffusion coefficients. Qualitative and quantitative changes of the spectrum of fibrin self-diffusion coefficients (SDCs) during polymerization were investigated and analyzed. A symmetrical broadening of the spectrum at the beginning of polymerization and symmetrical narrowing at its final stages with conservation of the most probable SDC was explained on the basis of the hypothesis about the simultaneous action of fibrin polymerization and lyses.